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| In the Matter of                             | ) |                      |
|  | ) |                      |
| Amendment of the Commission's Rules with     | ) | GN Docket No. 12-354 |
| Regard to Commercial Operations in the 3550- | ) |                      |
| 3650 MHz Band                                | ) |                      |

February 20, 2013

## EXECUTIVE SUMMARY

Spectrum is the lifeblood of the mobile revolution—usage is skyrocketing, and North America leads the world in LTE deployment. However, this pace cannot be sustained without more spectrum, as the Commission, the Congress, and the President have all recognized.

The most dramatic innovations, opportunity, investment, and growth in the wireless ecosystem have been, and will continue to be, driven by exclusive-use, licensed spectrum. Thus, Ericsson recommends that the Commission continue its efforts to identify additional exclusive-use spectrum for commercial mobile broadband use.

Nonetheless, Ericsson recognizes the Commission faces a reality in which not all spectrum can easily be cleared of incumbent users, and we appreciate the Commission's efforts to unlock the potential of the underutilized 3.5 GHz band.

The Commission's proposal to make 150 MHz of spectrum available for wireless broadband use in the 3.5 GHz band creates possibilities for further innovation. Because LTE scales to allow for use of wide swaths of spectrum, the sheer amount of potential new spectrum available in the 3.5 GHz band will lead to exciting new mobile broadband applications. Moreover, the spectrum at issue has been standardized by the Third Generation Partnership Project (3GPP), and thus is "ready made" to begin supporting a device ecosystem in the U.S. and worldwide.

Ericsson urges the Commission to consider a broader range of options for the band than the *Notice* suggests to realize a commercial opportunity to provide broadband services to the consumer. For example, a sufficiently robust spectrum access system will allow for deployments of technologies beyond small cells. In addition, allowing uses beyond "safety of life" in the Priority Access tier of the band will unleash further innovation and create an environment for investment and the development of a device ecosystem. These comments set forth practical proposals for how these expanded options can work and the benefits they can offer to the American public.

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**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

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To: The Commission

**COMMENTS OF ERICSSON**

Ericsson hereby submits these comments in response to the Commission's *Notice of Proposed Rulemaking* ("Notice") which proposes to allow users to share spectrum resources with incumbents in the 3550-3650 MHz band, and seeks comment on whether to include the neighboring 3650-3700 MHz band under the new regulatory scheme.<sup>1</sup>

**INTRODUCTION**

Ericsson supports the Commission's goal of permitting wireless broadband use of the 3.5 GHz band.<sup>2</sup> Spectrum identified in this proceeding represents an important opportunity to make underutilized spectrum available for commercial mobile broadband use. However, exclusive-use spectrum is the lifeblood of today's mobile revolution, and therefore spectrum clearing should remain the priority policy for the Commission.

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<sup>1</sup> *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket 12-354, *Notice of Proposed Rulemaking*, FCC 12-148, 27 FCC Rcd 15594 (Dec. 12, 2012).

<sup>2</sup> Ericsson uses the term "3.5 GHz" in these comments to refer to the range of spectrum between 3550 and 3700 MHz.

As the *Notice* observes, “[d]emand for wireless broadband capacity is growing much faster than the availability of new spectrum.”<sup>3</sup> Ericsson recently issued a global mobility report, noting that the North American region leads the world in LTE deployment and the region’s users account for a significantly larger share of global mobile traffic volume than subscription numbers would imply.<sup>4</sup> Indeed, U.S. mobile data traffic grew 300% in 2011,<sup>5</sup> and overall, Ericsson projects that mobile traffic will grow 12 times in the next six years.<sup>6</sup> Technology evolution alone will not be enough to address this capacity demand: additional, suitable spectrum is needed.

The Commission,<sup>7</sup> the President,<sup>8</sup> and Congress<sup>9</sup> all have recognized that the United States must identify more mobile broadband spectrum if our networks are to keep pace with growing demands in the years ahead. The Plan recommended that 500 MHz be made available for wireless broadband within ten years, including 300 MHz for wireless broadband use within five years.<sup>10</sup> While Ericsson supports the Commission’s efforts to make underutilized 3.5 GHz

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<sup>3</sup> *Notice* at ¶ 2.

<sup>4</sup> *Ericsson Mobility Report on the Pulse of the Networked Society* at 8, 11 (Nov. 2012) (“*Ericsson Mobility Report*”), available at <http://www.ericsson.com/res/docs/2012/ericsson-mobility-report-november-2012.pdf>.

<sup>5</sup> FCC Chairman Julius Genachowski, *Winning the Global Bandwidth Race: Opportunities and Challenges for Mobile Broadband*, Prepared Remarks to the University of Pennsylvania (Oct. 4, 2012), available at [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-316661A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-316661A1.pdf).

<sup>6</sup> *Ericsson Mobility Report* at 10.

<sup>7</sup> *See Connecting America: The National Broadband Plan* (March 2010) (“Plan”), available at <http://www.broadband.gov/plan/>.

<sup>8</sup> *See* Memorandum for the Heads of Executive Departments and Agencies, Unleashing the Wireless Broadband Revolution, 75 Fed. Reg. 38387 (July 1, 2010) (Presidential Memorandum), available at <http://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution>.

<sup>9</sup> *See* Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, §§ 6401-02, 126 Stat. 222-25 (2012).

<sup>10</sup> *See Plan* at 10, 75.

spectrum available for mobile broadband use, shared spectrum must be considered a complement, not a substitute, for the exclusive-use, licensed spectrum that has enabled services leading to the explosion of consumer demand outlined above. Therefore the Commission should not subtract the 100 or 150 MHz of spectrum in the 3.5 GHz band from the goal of identifying 500 MHz of new spectrum for broadband use by 2020.

The Commission notes that adding small cells can play an important role as a means of increasing the utilization of this spectrum and as a means to address ever-increasing capacity demands.<sup>11</sup> Ericsson believes, however, that the 3.5 GHz band need not be limited to small cells. Although small cells certainly may be deployed in the band, the usage of the band should instead be dictated by the interference criteria implemented and enforced by the spectrum access system (“SAS”). By using the capabilities of the SAS, service providers can concentrate on their customers and their own business plans by implementing macro cells, if appropriate, especially in areas without specified exclusions zones. In addition, Ericsson believes the 3.5 GHz band offers an opportunity to enable wireless backhaul links. Such links would differ from traditional backhaul deployments by operating with directional antennas in non-line-of-sight scenarios.

Ericsson appreciates the opportunity to offer these comments that, we hope, will build on the Commission’s proposals and make the band even more viable for commercial products and services. In particular, Ericsson supports:

- A tiered-access regime that allows for commercial mobile broadband (“MBB”) operators and end-users to have access to the Priority Access tier that the *Notice*

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<sup>11</sup> See *Notice* at ¶ 4.

proposes to limit only to small cells serving “critical, quality-of-service dependent users;”<sup>12</sup>

- An SAS that can control other parameters beyond merely the geographic location of a device operating in the band; specific requirements subject of further study;
- Commercial entities to manage SAS databases;
- Harmonizing the 3550-3700 MHz band with 3GPP Bands 42 and 43;
- Licensed shared access in the Priority Access band;
- Rules that support large, contiguous channel allocations of multiples of 5 MHz;
- Channel aggregation. The LTE standard currently supports 20 MHz carriers with the possibility to aggregate up to five carriers;
- Inclusion of 3650-3700 MHz frequencies;
- Further study of the exclusion zones outlined in the *Notice*. The analysis that appears in the *Notice* is based on NTIA’s Fast Track Report,<sup>13</sup> which analyzed the interference from DoD radars was based on commercial WiMAX technology deployed in a traditional macrocellular network without an SAS.

## **I. TIERED-ACCESS FRAMEWORK**

While Ericsson supports efforts to explore and promote shared use between federal and commercial users in *this* band, we reiterate that the federal government should pursue clearing as its preferred approach for other bands, particularly those below 3 GHz. Nevertheless, the Commission’s three-tiered approach to providing licensing and interference protection within the 3.5 GHz band could offer additional capacity for MBB.<sup>14</sup> Ericsson proposes three major differences to the operations within those tiers:

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<sup>12</sup> *Notice* at ¶ 8. The *Notice* suggests that those entities which could benefit from a quality-of-service regime include hospitals, utilities, governments, and “other users” with a need for “reliable, prioritized access to broadband spectrum.” *Id.*

<sup>13</sup> NTIA, An assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, 4200-4220 MHz, and 4380-4400 MHz Bands (rel. Oct. 2010) (“Fast Track Report”)

<sup>14</sup> *See Notice* at ¶ 53.

- 1) Within the second Tier, Ericsson believes that MBB operators, who have similar Quality of Service (“QoS”) concerns as do those the Commission identifies as having safety-of-life operations, should be permitted to have access to this Tier.
- 2) The third Tier—General Authorized Access (“GAA”)—should be subject to lower power limits and would typically be used for very short range or indoor use.
- 3) WISPs could choose to be a Tier 2 operator or stay within the GAA tier.

Figure 1 below outlines the incumbent users of the band (Tier 1), Ericsson’s proposals for Tier 2 and the Commission’s GAA tier, and illustrates the overlap with 3GPP Bands 42 and 43.

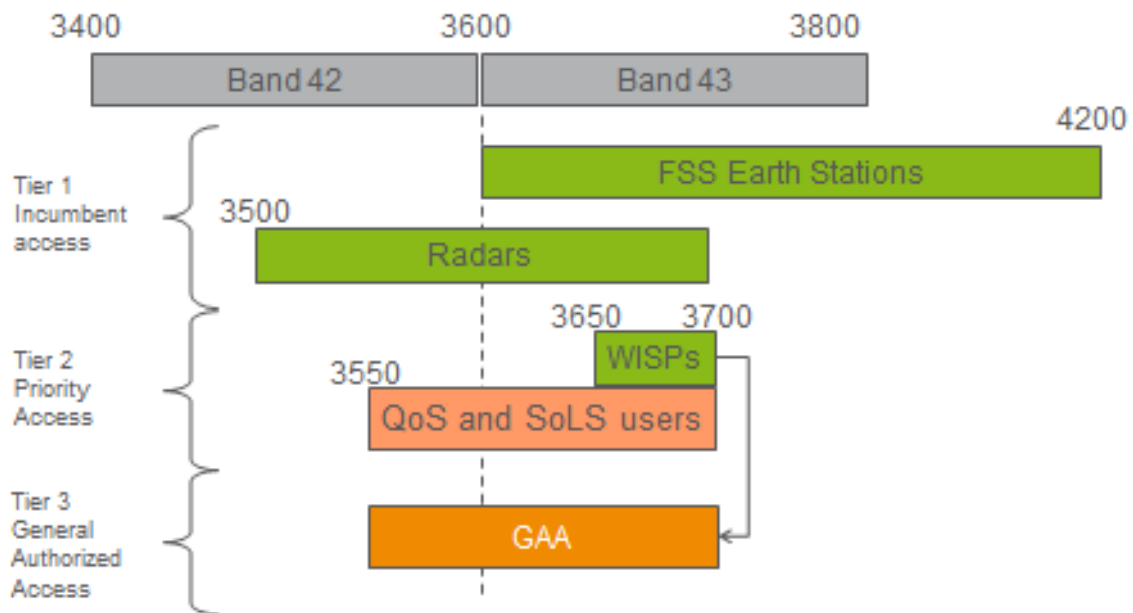


Figure 1

With regard to the priority access tier (Tier 2), Ericsson notes that the very reasons the Commission proposes to limit its use to safety-of-life operations are the reasons of value to providers of MBB service who serve end-user customers. Prioritized access, with protection from harmful interference from all but incumbent users,<sup>15</sup> is beneficial for broadband access

<sup>15</sup> See Notice at ¶ 70.



providers and their subscribers as well as for hospitals. For ease of discussion, we will refer to non-safety-of-life operations that might still benefit from a greater quality of service than GAA users as “QoS users.”

We recognize that, as the Commission notes, “dedicated spectrum is in short supply and it is unlikely that enough spectrum will be freed in the near future to meet the escalating needs of these critical users.”<sup>16</sup> Ericsson does not propose to supplant the Commission’s vision of safety-of-life services (“SoLS users”) with commercial providers, but rather to allow both types of users access to Tier 2 Priority Access. We believe that the SAS, discussed below, can mediate access to the 3.5 GHz band between SoLS and QoS users. Furthermore, Ericsson assumes that SoLS operations will be limited to indoor use (*e.g.*, hospitals), which increases the feasibility of coexistence between SoLS and QoS users.

This plan has the advantage of allowing SoLS users access to the *entire* 3.5 GHz band. Rather than segregating off a portion (*e.g.*, 50 MHz) of the band as proposed,<sup>17</sup> the SAS could allow QoS and SoLS users to coexist in the entire band, with SoLS users receiving a higher priority of access when needed.<sup>18</sup> This is also important because access to the entire band better aligns with existing 3GPP standards and it is expected that LTE devices deployed globally in this spectrum could benefit both the SoLS community and the U.S. device ecosystem in general. The LTE standard allows for macrocell, microcell, picocell, and fixed deployment in Bands 42 and 43.

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<sup>16</sup> Notice at ¶ 73.

<sup>17</sup> See Notice at ¶ 72.

<sup>18</sup> Because Ericsson envisions SoLS to be indoors (hospitals, in-house medical uses), the actual number of potential conflicts among users of the band should be fairly minimal. In addition, we note that a great deal of new spectrum is being dedicated – with no federal incumbent users to work around – in the 700 MHz band.

Uses of GAA (Tier 3) could include fixed or mobile consumer level devices, similar to Wi-Fi devices. Use of GAA devices would be permitted in areas where such devices would not cause harmful interference to incumbent operations (Tier 1) and QoS/SoLS users (Tier 2) but where signals from higher-tier operations could be expected to interfere with GAA uses on occasion.

Finally, while Ericsson's vision for the GAA tier is one which includes more general access for more ad hoc deployment, nothing would preclude users in this tier from using the same devices expected to develop in the QoS and SoLS tier (Tier 2). While channelization in the GAA tier could certainly allow for the existence 802.11 family of devices, GAA users could also benefit from the economies of scale that we expect LTE technology will bring to QoS users.

## **II. THE SAS DATABASE AND LICENSED SHARED ACCESS**

### **a. SAS**

Ericsson views the SAS as more than a database, although there certainly are major similarities between the SAS and other spectrum databases, such as that used for TV White Spaces ("TVWS").<sup>19</sup> However, in the 3.5 GHz band, the SAS would take on a policy manager's role. The SAS will not only have to take geography into account, but could manage and negotiate

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<sup>19</sup> An analogy can be drawn between the tiered access system proposed and the current TVWS database system. The incumbent users proposed in the *Notice* are in many ways similar to the television broadcasters in the TVWS system: they are the primary users of the band and receive protection from all harmful interference through the use of geographically defined exclusion zones contained in the TVWS databases. Information regarding the incumbent users can be obtained from either a federal system (in the case of TVWS systems, this information is obtained from the Commission's Consolidated Database System [CDBS] and Universe Licensing Systems [ULS], among others), or a secure private system that acts as a proxy for a federal system. The QoS user tier proposed is roughly equivalent to services that request separate protection from the database providers. These users do not have the same usage rights to the spectrum as do the incumbent users, but are protected from harmful interference in the same way, through exclusion zones centered on their transmitters and/or receivers.

network deployment characteristics such as fixed vs. portable deployments, typical deployment heights of antennas on infrastructure, antenna gains, direction of sectorization, adaptability and time variability of antenna patterns, power levels, and the emission characteristics of different types of equipment. The SAS potentially also could analyze interference statistics from various networks, cooperatively provided by measurements appropriately that are aggregated by networks. Such statistics can potentially offer a dynamic basis for policy adjustments on a slow and on-going basis.

In addition, priority access could be requested, approved, and registered with an SAS in a fashion similar to that in which an Unlicensed Microphone venue, or other protection-eligible services (MVPD, Temporary BAS, and licensed wireless microphone), are registered for TVWS protection today. For example, an SoLS user would register and receive priority access over QoS requests in a specified geographical area, indoors. In addition, having GAA radios query at regular intervals is also analogous to the TVWS rules, although the polling interval for such devices will likely need to be more frequent than the one time per 24 hours currently required for fixed TVWS devices. Scalable, high-performance, distributed databases available today allow for very frequent polling by large numbers of devices.

The SAS will be able to manage QoS users and GAA users geographically, through frequency separation, or other mechanisms. Ericsson supports an SAS that regulates the presence of QoS, SoLS, and GAA users in the 3.5 GHz band. The SAS will use a geolocation database along with appropriate policy mechanisms that allow QoS, SoLS, and GAA users to coexist in the band with incumbent users.

At a minimum, the SAS will have to mediate usage of the 3.5 GHz band based on geographic contours dictated by the ship borne, airborne, and ground-based radar systems,<sup>20</sup> but at this time, the exact functionality of the database is somewhat unknown without a further understanding of the co-channel and adjacent channel interference environment and the degree to which incumbent operations can share information. We therefore propose further study of additional needs for the SAS.<sup>21</sup>

#### **b. LSA functionality**

Because of the functionality required of the SAS, Ericsson asks the Commission to look to the principles that are already being considered for Licensed Shared Access (LSA). LSA is a regulatory approach that unlocks and improves underutilized spectrum while offering dependable service quality, security for large-scale investments, and reliable protection of an incumbent or priority user. It addresses exclusive rights spectrum that currently belongs to an incumbent or priority user and that exhibits low or localized utilization at stable (or diminishing) levels, and where it is difficult or not desired to re-distribute or re-purpose the spectrum to other services within a needed time frame. Specific policy mechanisms for the 3.5 GHz band may need further enhancements of LSA, and we recommend this for further study.

LSA assigns secondary licenses that are similar in structure to dedicated, licensed spectrum with similar benefits. LSA spectrum use is binary: either by the incumbent / priority user or by the LSA licensee in any given place and any given time. The low or localized

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<sup>20</sup> See Notice at ¶¶ 102-03, 113.

<sup>21</sup> See *infra*, Section V.

utilization at stable (or diminishing) levels means that the predictability of LSA license use is high. This allows for secure and dependable conditions that enable large-scale investments.

A novel aspect of LSA licenses is that the licensee, in order to use the license, needs an agreement with the incumbent user that regulates the terms of shared use, *e.g.*, geographical areas, technical conditions for protection, how to vacate use when and if needed. Since LSA licensees are known and limited in number the incumbent or priority user can be certain that it is given adequate protection.

LSA regulations facilitate agreements between incumbents and priority users through well-defined processes and standardized technical conditions. In particular, spectrum geo-location databases, with standardized information elements, access protocols, and policy mechanisms, are an important component to enable incumbent / priority protection, enforce national regulatory policies and objectives, and minimize restrictions to shared use by LSA licensees.

The LSA concept is currently being further developed within The Radio Spectrum Policy Group (RSPG) of the European Commission, which will issue a report on LSA in the fall of this year. Within the same time frame the European Conference of Postal and Telecommunications Administrators (CEPT) Electronic Communications Committee (ECC) Frequency Management working group (FM53) will develop a draft ECC Decision on LSA. Ongoing work for the 2.3-2.4 GHz band in Europe will benefit from LSA regulations (FM52). The European Telecommunications Standards Institute (ETSI) Reconfigurable Radio Systems (RRS) technical committee continues to advance standardization activities on LSA technical conditions and geo-location databases.

### **c. Security of the SAS**

Ericsson recognizes that certain information pertaining to protected entities in the 3.5 GHz band are sensitive, such as the location of naval vessels in port or offshore. A centralized, secure federally managed database containing information about the presence of naval vessels in port could feed information via a secured link to the commercial SAS databases. Both the federal source data for incumbent users and registration information for priority users can be secured with ordinary web based security mechanisms such as Transport Layer Security (“TLS”) with certificate based authentication.<sup>22</sup>

Other measures can be taken to provide additional security to prevent the determination of when naval vessels are in port via an analysis of channel availability patterns over time. For example, one such measure would be to provide some randomization of data presentation to the public of channel availability in those sensitive areas.

### **d. Potential models for an SAS infrastructure**

Considerations regarding the cost of developing an SAS are always of concern. If a multi-administrator commercial model is used similar to TVWS, the cost to build the database would be borne by the competing vendors. If a single or few SAS operators are to be named where development is funded by the government, adoption of models that leverage the work already performed by the TVWS databases could substantially lower the needed initial

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<sup>22</sup> The work being performed in the Internet Engineering Task Force (IETF) Protocol for Accessing White Spaces (PAWS) working group for secure device access to a TVWS database could help inform the Commission’s decision-making as it determines appropriate vehicles to safeguard the information flowing into and out of the SAS. The PAWS working group continues to develop standards that address authentication mechanisms, secure transport requirements, and messaging formats for communication of required messages between a white space device and a white space database.

investment for SAS development. A process for creation and management of the SAS that resembles that used for TVWS, where the database vendors work cooperatively with the Commission and the stakeholders to identify the data, features and edits over time that need to be included in the SAS, would allow for initial implementation that, over time, gradually adds detailed direction only as necessary.

The work done by the TVWS Database Group and the IETF PAWS group is an example of an operational system that uses standard Internet and electronic commerce protocols for access to the database by devices and between databases in a multi-database environment. If it is determined that the data should be publically accessible in whole or in part, the TVWS model also demonstrates the database vendors' ability to display the information available in various manners from download of the database contents to displays of contours of protections for entities and of channel availability at particular locations.

A commercial solution with multiple vendors allows for the lowest cost implementation by exploiting competitive pressure between vendors. The TVWS experience has demonstrated that multiple databases can demonstrate compliance and near real-time interoperability while keeping costs down. The TVWS model also demonstrates the ability to periodically download device authorization and de-authorization from Commission systems. The Commission's Office of Engineering and Technology has tested the two certified databases and two certified TVWS devices to demonstrate that the devices do, indeed, cease to broadcast on a channel when

authorization is removed from the database.<sup>23</sup> This type of real-time de-authorization illustrates the capability of a database system to quickly adapt to changing conditions.

Adopting a competitive commercial model for SAS database administration is an effective method to ensure there is an ability to evolve as technology evolves. The need for vendors to compete for customers will help ensure innovation and technological evolution in the provision of database services.

### **III. ALIGNMENT WITH 3GPP BANDS 42 AND 43**

As noted above, 3GPP has already specified Bands 42 and 43 for LTE operation. Because of the potential for globally harmonized use of the 3.5 GHz band, Ericsson urges the Commission to align as much as possible with the standards that have already been developed for the band. Doing so will not only lower the cost of end user devices through economies of scale, but it will also minimize interference and facilitate worldwide compatibility and global roaming.

As the Commission notes in paragraph 29 of the *Notice*, the 3400-3600 MHz band has been identified for IMT in various areas, and the 3500-3700 MHz band is allocated to Fixed, Fixed Satellite, and Mobile Services on a primary basis in Region 2. The recognition by the ITU and 3GPP of the importance of the 3.5 GHz for MBB should be a driving factor for deployment of the band. Even if the spectrum licensing schemes for the band are different in various countries it would still be possible to achieve commonality of system design, for example by

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<sup>23</sup> See FCC Encyclopedia, White Spaces Database Administrators Guide, available at <http://www.fcc.gov/encyclopedia/white-space-database-administrators-guide>.



adding overlay features to comply with the licensing rules, including power levels and frequency arrangement.<sup>24</sup>

Band 42 and 43 channel bandwidths are denoted in multiples of 5 MHz. In order to ensure that LTE technology can make the most use of this band, Ericsson urges the Commission to adopt rules that support large, contiguous channel allocations in multiples of 5 MHz. The LTE standard currently supports 20 MHz carriers with the possibility to aggregate up to five carriers.

#### **IV. INCLUSION OF 3650-3700 MHz**

Ericsson supports the Commission's suggestion that the 3650-3700 MHz band be included in the overall regulatory scheme for the 3.5 GHz band. As noted above, not only would including this band result in more total spectrum available for QoS and SoLS users, but also it avoids co-channel interference with mobile radars. Ericsson recognizes that current users of this

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<sup>24</sup> The following ITU, CITEL, and CEPT recommendations and decisions illustrate the global interest in 3.5 GHz spectrum and may be of use in harmonizing the band to global allocations: Recommendation ITU-R M.1036-4, *Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications (IMT) in the bands identified for IMT in the Radio Regulations (RR)*, (covering international frequency arrangements for all the bands identified for IMT in the ITU Radio Regulations, including 3400-3600 MHz), available at <http://www.itu.int/rec/R-REC-M.1036>; Recommendation PCC.III/REC.47 (XII-99), *Frequency band plan for FWA systems in the range 3400-3700 MHz*, (recommending a sub-band plan based on 25 MHz blocks or subdivided 25 MHz blocks according to national and regional requirements), available at <http://www.oas.org/citeldocuments/Download.aspx?id=1257>; Recommendation ITU-R F.1488, *Frequency block arrangements for fixed wireless access systems in the range 3400-3800 MHz*, (recommending block [sub-band] edge frequencies which are exactly divisible by 0.25 MHz and including a frequency arrangement based on 25 MHz blocks [sub-bands] consisting of 16 adjacent 25 MHz blocks starting at 3400 MHz), available at <http://www.itu.int/rec/R-REC-F.1488>; CEPT ECC Decision 11(06), *Harmonised frequency arrangements for mobile/fixed communications networks (MFCN) operating in the bands 3400-3600 MHz and 3600-3800 MHz*, (proposing a frequency arrangement for the implementation of mobile broadband in the band 3600-3800 MHz based on TDD, with a block size of 5 MHz starting at the lower edge of 3600 MHz), available at <http://www.ero-docdb.dk/docs/doc98/official/pdf/ECCDec1106.pdf>; Recommendation ITU-R M.2012, *Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications Advanced (IMT-Advanced)*, and Recommendation ITU-R M.1457, *Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT-2000)*, (incorporating 3GPP for band 22 [3410 – 3490 MHz / 3510 – 3590 MHz] for FDD and the bands 42 [3400 – 3600 MHz] and 43 [3600 – 3800 MHz] for TDD, including their corresponding sets of technical requirements), available at <http://www.itu.int/rec/R-REC-M.2012/en> and <http://www.itu.int/rec/R-REC-M.1457/en>.

band—mainly Wireless Internet Service Providers (WISPs)—currently provide important service to end users, utilities, businesses, and public safety entities.<sup>25</sup> We believe that WISPs should be able to operate in the Priority Access tier upon approval by the Commission.

## **V. AREAS FOR FURTHER STUDY**

There are several aspects of use of the 3.5 GHz band that could benefit from further study. Ericsson recommends that the Commerce Spectrum Management Advisory Committee (“CSMAC”) is an appropriate venue for further work to ensure that the 3.5 GHz band can support wireless broadband operations. The CSMAC has had recent success analyzing the potential for sharing the 1695-1710 MHz band between commercial and incumbent users.<sup>26</sup> Ericsson suggests that this same group could encourage communications between the incumbent federal agencies using the 3.5 GHz band and industry to discuss relevant technical and coordination issues, with the goal of identifying approaches that maintain critical federal missions and optimize the economic value of the band.

At the outset, Ericsson notes that the NTIA analysis cited in the *Notice* considered WiMAX technology for shared use of the 3.5 GHz Band.<sup>27</sup> However, the management and control technologies (specifically, the SAS) proposed in the *Notice* alter some of the assumptions in this analysis.<sup>28</sup> Because Ericsson is recommending that the 3.5 GHz band include commercial mobile broadband services, we recommend the CSMAC analyze whether commercial

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<sup>25</sup> See *Notice* at ¶ 78.

<sup>26</sup> See Report to the President, *Identification of 15 Megahertz of Spectrum Between 1675 and 1710 MHz for Reallocation from Federal Use to Non-Federal Use Pursuant to Section 6401(a) of the Middle Class Tax Relief and Job Creation Act of 2012* (Feb. 2013).

<sup>27</sup> See *Notice* at ¶ 113.

<sup>28</sup> See *Notice* at ¶ 68.

deployments may be placed closer to incumbent users than proposed in the *Notice*. We recommend that CSMAC consider further coexistence and sharing studies in the 3.5 GHz band, specifically:

- Extension of the evaluation methodology recommended by CSMAC WG-1 to the 3.5 GHz band;
- The minimum geographical separation between MBB and radar to prevent MBB base station and user equipment cochannel interference into radar operation;
- The minimum geographical and frequency separation between MBB and radar to protect MBB users from radar operations;
- Interaction with federal users to determine architecture and parameters needed for SAS operation;
- Coexistence between QoS/SoLS and GAA users and among QoS/SoLS users;
- Whether performance of FSS receivers can be improved to limit interference from increased activity in the 3.5 GHz band;<sup>29</sup>
- Cross-border coordination issues;
- Whether the 3700-3800 MHz band could also be repurposed for commercial use;<sup>30</sup>
- How the results from the ECC Report 174 impact the radar analysis in the NTIA's Fast Track Report;
- Use of high gain antennas and deployment of NLOS point-to-multipoint backhaul links.

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<sup>29</sup> See *Notice* at ¶ 127.

<sup>30</sup> Federal civilian and military agencies use the 3700-3800 MHz band to operate communications satellite earth stations for voice, data, and video transmissions using commercial geostationary satellites. This band is used for the reception of downlink signals and is paired with the band 5925-6425 MHz that is used for transmission of the uplink signals. *Federal Spectrum Use Summary 30 MHz – 3000 GHz National Telecommunications and Information Administration Office of Spectrum Management* (June 21, 2010), at 43.

Ericsson recommends alignment with ITU and 3GPP extending to 3800 MHz consistent with our prior filing in response to the Commission's public notice seeking comment on the NTIA Fast-Track Report. See Comments of Ericsson, *Spectrum Task Force Requests Information on Frequency Bands Identified by NTIA as Potential Broadband Spectrum*, ET Docket No. 10-123 (Apr. 22, 2011), at 26-28.

## CONCLUSION

For the foregoing reasons, Ericsson recommends that the Commission allow commercial mobile broadband users to share the 3.5 GHz band with incumbent government users. By utilizing enhanced database techniques described above, Ericsson believes that harmonized spectrum in the 3.5 GHz band could help serve existing and forecasted data traffic needs.

Respectfully submitted,

ERICSSON

By: /s/ Mark Racek

Mark Racek  
Director, Spectrum Policy

Ericsson  
1634 I St., NW, Suite 600  
Washington, DC 20006

Telephone: (202) 824-0110  
Fax: (202) 783-2206  
Email: mark.racek@ericsson.com

By: /s/ Jared M. Carlson

Jared M. Carlson  
Director, Government and  
Industry Relations

Ericsson  
1634 I St., NW, Suite 600  
Washington, DC 20006

Telephone: (202) 824-0112  
Fax: (202) 783-2206  
Email: jared.carlson@ericsson.com

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